

## **I. INTRODUCTION**

- A. Purpose: To provide Department standards for fire flow, hydrant spacing and specifications.
- B. Scope: Informational to the general public and instructional to all individuals, companies, or corporations involved in the subdivision of land, construction of buildings, or alterations and/or installation of fire protection water systems and hydrants.
- C. Author: The Deputy Chief of the Prevention Services Bureau through the Assistant Fire Chief (Fire Marshal) of the Fire Prevention Division is responsible for the origin and maintenance of this regulation.
- D. Definitions:
  - 1. GPM – gallons per minute
  - 2. psi – pounds per square inch
  - 3. Detached condominiums – single detached dwelling units on land owned in common
  - 4. Multiple family dwellings – three or more dwelling units attached

## **II. RESPONSIBILITY**

- A. Land Development Unit
  - 1. The Department's Land Development Unit shall review all subdivisions of land and apply fire flow and hydrant spacing requirements in accordance with this regulation and the present zoning of the subdivision or allowed land use as approved by the County's Regional Planning Commission or city planning department.
- B. Fire Prevention Engineering Section
  - 1. The Department's Fire Prevention Engineering Section shall review building plans and apply fire flow and hydrant spacing requirements in accordance with this regulation.

### III. POLICY

- A. The procedures, standards, and policies contained herein are provided to ensure the adequacy of, and access to, fire protection water and shall be enforced by all Department personnel.

### IV. PROCEDURES

- A. Land development: fire flow, duration of flow, and hydrant spacing

The following requirements apply to land development issues such as: tract and parcel maps, conditional use permits, zone changes, lot line adjustments, planned unit developments, etc.

		<u>Fire Flow</u>	<u>Duration of Flow</u>	<u>Public Hydrant Spacing</u>
1.	Residential Fire Zones 3 Very High Fire Hazard Severity Zone (VHFHSZ)			
a.	Single family dwelling and detached condominiums (1 – 4 Units) (Under 5,000 square feet)	1,250 GPM	2 hrs.	600 ft.
b.	Detached condominium (5 or more units) (Under 5,000 square feet)	1,500 GPM	2 hrs.	300 ft.
c.	Two family dwellings (Duplexes)	1,500 GPM	2 hrs.	600 ft.
NOTE:		FOR SINGLE FAMILY DWELLINGS OVER 5,000 SQUARE FEET. SEE, TABLE 1 FOR FIRE FLOW REQUIREMENTS PER BUILDING SIZE.		

2. Multiple family dwellings, hotels, high rise, commercial, industrial, etc.
  - a. Due to the undetermined building designs for new land development projects (***undeveloped land***), the required fire flow shall be: 5,000 GPM 5 hrs. 300 ft.

NOTE: REDUCTION IN FIRE FLOW IN ACCORDANCE WITH TABLE 1.

- b. Land development projects consisting of lots having existing structures shall be in compliance with Table 1 (fire flow per building size). This standard applies to multiple family dwellings, hotels, high rise, commercial, industrial, etc.

NOTE: FIRE FLOWS PRECEDING ARE MEASURED AT 20 POUNDS PER SQUARE INCH RESIDUAL PRESSURE.

## B. Building plans

The Department's Fire Prevention Engineering Section shall review building plans and apply fire flow requirements and hydrant spacing in accordance with the following:

### 1. Residential

Building Occupancy Classification	<u>Fire Flow</u>	<u>Duration of Flow</u>	<u>Public Hydrant Spacing</u>
a. Single family dwellings - Fire Zone 3 (Less than 5000 square feet)			
On a lot of one acre or more	750 GPM	2 hrs.	600 ft.
On a lot less than one acre	1,250 GPM	2 hrs	600 ft.
b. Single family dwellings - VHFHSZ (Less than 5,000 square feet)			
On a lot of one acre or more	1,000 GPM	2 hrs.	600 ft.
On lots less than one acre	1,250 GPM	2 hrs.	600 ft.

NOTE: FOR SINGLE FAMILY DWELLINGS GREATER THAN 5,000 SQUARE FEET IN AREA SEE TABLE

c. Two-family dwelling units

Duplexes	1,500 GPM	2 hrs.	600 ft.
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2. Mobile home park

a. Recreation bldg. Refer to Table 1 for fire flow according to building size

b. Mobile home park 1,250 GPM 2 hrs. 600 ft.

3. Multiple residential, apartments, single family residences (greater than 5,000 square feet), private schools, hotels, high rise, commercial, industrial, etc. (R-1, E, B, A, I, H, F, M, S) (see Table 1).

C. Public fire hydrant requirements

1. Fire hydrants shall be required at intersections and along access ways as spacing requirements dictate.

2. Spacing

a. Cul-de-sac

When cul-de-sac depth exceeds 450' (residential) or 200' (commercial), hydrants shall be required at mid-block. Additional hydrants will be required if hydrant spacing exceeds specified distances.

b. Single family dwellings

Fire hydrant spacing of 600 feet

NOTE: The following guidelines shall be used in meeting single family dwellings hydrant spacing requirements:

- (1) Urban properties (more than one unit per acre):  
No portion of lot frontage should be more than 450' via vehicular access from a public hydrant.

- (2) Non-Urban Properties (less than one unit per acre):  
No portion of a structure should be placed on a lot where it exceeds 750' via vehicular access from a properly spaced public hydrant that meets the required fire flow.

c. All occupancies

Other than single family dwellings, such as commercial, industrial, multi-family dwellings, private schools, institutions, detached condominiums (five or more units), etc.

Fire hydrant spacing shall be 300 feet.

NOTE: The following guidelines shall be used in meeting the hydrant spacing requirements.

- (1) No portion of lot frontage shall be more than 200 feet via vehicular access from a public hydrant.
- (2) No portion of a building should exceed 400 feet via vehicular access from a properly spaced public hydrant.

d. Supplemental fire protection

When a structure cannot meet the required public hydrant spacing distances, supplemental fire protection shall be required.

NOTE: Supplemental fire protection is not limited to the installation of on-site fire hydrants; it may include automatic extinguishing systems.

3. Hydrant location requirements - both sides of a street

Hydrants shall be required on both sides of the street whenever:

- a. Streets having raised median center dividers that make access to hydrants difficult, causes time delay, and/or creates undue hazard.
- b. For situations other than those listed in "a" above, the Department's inspector's judgment shall be used. The following items shall be considered when determining hydrant locations:
  - (1) Excessive traffic loads, major arterial route, in which traffic would be difficult to detour.

- (2) Lack of adjacent parallel public streets in which traffic could be redirected (e.g., Pacific Coast Highway).
- (3) Past practices in the area.
- (4) Possibility of future development in the area.
- (5) Type of development (i.e., flag-lot units, large apartment or condo complex, etc.).
- (6) Accessibility to existing hydrants
- (7) Possibility of the existing street having a raised median center divider in the near future.

**D. On-site hydrant requirements**

- 1. When any portion of a proposed structure exceeds (via vehicular access) the allowable distances from a public hydrant and on-site hydrants are required, the following spacing requirements shall be met:
  - a. Spacing distance between on-site hydrants shall be 300 to 600 feet.
    - (1) Design features shall assist in allowing distance modifications.
  - b. Factors considered when allowing distance modifications.
    - (1) Only sprinklered buildings qualify for the maximum spacing of 600 feet.
    - (2) For non-sprinklered buildings, consideration should be given to fire protection, access doors, outside storage, etc. Distance between hydrants should not exceed 400 feet.
- 2. Fire flow
  - a. All on-site fire hydrants shall flow a minimum of 1,250 gallons per minute at 20 psi for a duration of two hours. If more than one on-site fire hydrant is required, the on-site fire flow shall be at least 2,500 gallons per minute at 20 psi, flowing from two hydrants simultaneously. On site flow may be greater depending upon the size of the structure and the distance from public hydrants.

NOTE: ONE OF THE TWO HYDRANTS TESTED SHALL BE THE FARTHEST FROM THE PUBLIC WATER SOURCE.

3. Distance from structures

All on-site hydrants shall be installed a minimum of 25 feet from a structure or protected by a two-hour firewall.

4. Shut-off valves

All on-site hydrants shall be equipped with a shut-off (gate) valve, which shall be located as follows:

- a. Minimum distance to the hydrant 10 feet
- b. Maximum distance from the hydrant 25 feet

5. Inspection of new installations

All new on-site hydrants and underground installations are subject to inspection of the following items by a representative of the Department:

- a. Piping materials and the bracing and support thereof.
  - b. A hydrostatic test of 200 psi for two hours.
  - c. Adequate flushing of the installation.
  - d. Flow test to satisfy required fire flow.
- (1) Hydrants shall be painted with two coats of red primer and one coat of red paint, with the exception of the stem and threads, prior to flow test and acceptance of the system.

6. Maintenance

It shall be the responsibility of the property management company, the homeowners association, or the property owner to maintain on-site hydrants.

- a. Hydrants shall be painted with two coats of red primer and one coat of red, with the exception of the stem and threads, prior to flow test and acceptance of the system.
- b. No barricades, walls, fences, landscaping, etc., shall be installed or planted within three feet of a fire hydrant.

E. Public hydrant flow procedure

The minimum acceptable flow from any existing public hydrant shall be 1,000 GPM unless the required fire flow is less. Hydrants used to satisfy fire flow requirements will be determined by the following items:

1. Only hydrants that meet spacing requirements are acceptable for meeting fire flow requirements.
2. In order to meet the required fire flow:
  - a. Flow closest hydrant and calculate to determine flow at 20 pounds per square inch residual pressure. If the calculated flow does not meet the fire flow requirement, the next closest hydrant shall be flowed simultaneously with the first hydrant, providing it meets the spacing requirement, etc.
  - b. If more than one hydrant is to be flowed in order to meet the required fire flow, the number of hydrants shall be flowed as follows:

One hydrant	1,250 GPM and below
Two hydrants	1,251– 3,500 GPM flowing simultaneously
Three hydrants	3,501– 5,000 GPM flowing simultaneously

F. Hydrant upgrade policy

1. Existing single outlet 2 1/2" inch hydrants shall be upgraded to a double outlet 6" x 4" x 2 1/2" hydrant when the required fire flow exceeds 1,250 GPM.
2. An upgrade of the fire hydrant will not be required if the required fire flow is between the minimum requirement of 750 gallons per minute, up to and including 1,250 gallons per minute, and the existing public water system will provide the required fire flow through an existing wharf fire hydrant.
3. All new required fire hydrant installations shall be approved 6" x 4" x 2 1/2" fire hydrants.
4. When water main improvements are required to meet GPM flow, and the existing water main has single outlet 2 1/2" fire hydrant(s), then a hydrant(s) upgrade will be required. This upgrade shall apply regardless of flow requirements.

G. Hydrant specifications

All required public and on-site fire hydrants shall be installed to the following specifications prior to flow test and acceptance of the system.

1. Hydrants shall be:
  - a. Installed so that the center line of the lowest outlet is between 14 and 24 inches above finished grade
  - b. Installed so that the front of the riser is between 12 and 24 inches behind the curb face
  - c. Installed with outlets facing the curb at a 45-degree angle to the curb line if there are double outlet hydrants
  - d. Similar to the type of construction which conforms to current A.W.W.A. Standards
  - e. Provided with three-foot unobstructed clearance on all sides
  - f. Provided with approved plastic caps
  - g. Painted with two coats of red primer and one coat of traffic signal yellow for public hydrants and one coat of red for on-site hydrants, with the exception of the stems and threads
2. Underground shut-off valves are to be located:
  - a. A minimum distance of 10 feet from the hydrant
  - b. A maximum distance of 25 feet from the hydrant

Exception: Location can be less than 10 feet when the water main is already installed and the 10-foot minimum distance cannot be satisfied.
3. All new water mains, laterals, gate valves, buries, and riser shall be a minimum of six inches inside diameter.
4. When sidewalks are contiguous with a curb and are five feet wide or less, fire hydrants shall be placed immediately behind the sidewalk. Under no circumstances shall hydrants be more than six feet from a curb line.

5. The owner-developer shall be responsible for making the necessary arrangements with the local water purveyor for the installation of all public facilities.
6. Approved fire hydrant barricades shall be installed if curbs are not provided (see Figures 1, 2, and 3 following on pages 11 and 12).

## Barricade/Clearance Details

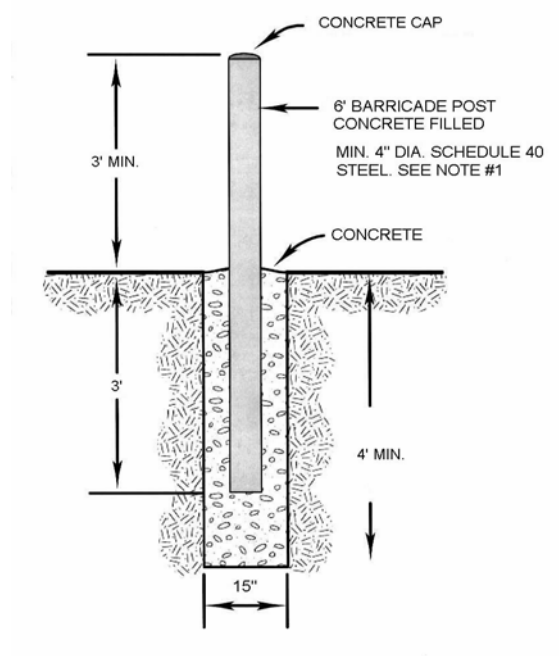


Figure 1

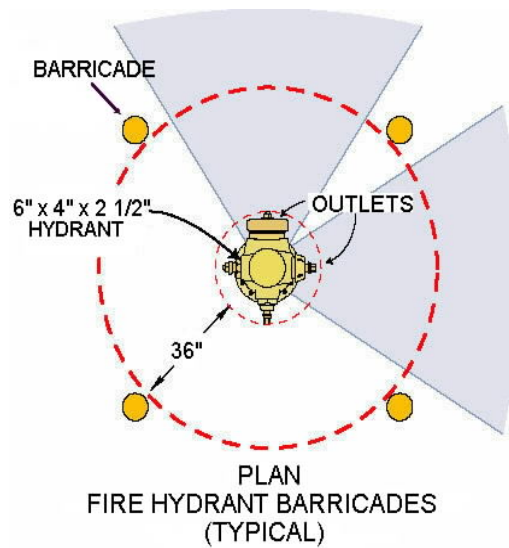


Figure 2

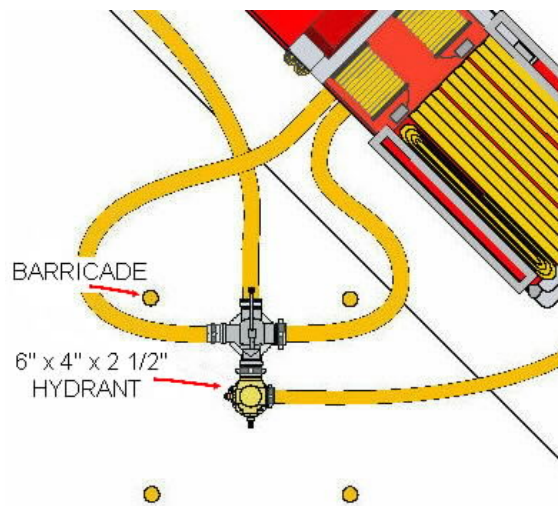


Figure 3

Notes:

1. Constructed of steel not less than four inches in diameter, six inches if heavy truck traffic is anticipated, schedule 40 steel and concrete filled.
2. Posts shall be set not less than three feet deep in a concrete footing of not less than 15 inches in diameter, with the top of the posts not less than three feet above ground and not less than three feet from the hydrant
3. Posts, fences, vehicles, growth, trash storage and other materials or things shall not be placed or kept near fire hydrants in a manner that would prevent fire hydrants from being immediately discernable.
4. If hydrant is to be barricaded, no barricade shall be constructed in front of the hydrant outlets (Figure 2, shaded area).
5. The exact location of barricades may be changed by the field inspector during a field inspection.
6. The steel pipe above ground shall be painted a minimum of two field coats of primer.
7. Two finish coats of "traffic signal yellow" shall be used for fire hydrant barricades.
8. Figure 3 shows hydrant hook up during fireground operations. Notice apparatus (hydra-assist-valve) connected to hydrant and the required area. Figure 3 shows the importance of not constructing barricades or other obstructions in front of hydrant outlets.

H. Private fire protection systems for rural commercial and industrial development

Where the standards of this regulation cannot be met for industrial and commercial developments in rural areas, alternate proposals which meet NFPA Standard 1142 may be submitted to the Fire Marshal for review. Such proposals shall also be subject to the following:

1. The structure is beyond 3,000 feet of any existing, adequately-sized water system.
  - a. Structures within 3,000 feet of an existing, adequately-sized water system, but beyond a water purveyor service area, will be reviewed on an individual basis.
2. The structure is in an area designated by the County of Los Angeles' General Plan as rural non-urban.

I. Blue reflective hydrant markers replacement policy

1. Purpose: To provide information regarding the replacement of blue reflective hydrant markers, following street construction or repair work.
  - a. Fire station personnel shall inform Department of Public Works Road Construction Inspectors of the importance of the blue reflective hydrant markers, and encourage them to enforce their Department permit requirement, that streets and roads be returned to their original condition, following construction or repair work.
  - b. When street construction or repair work occurs within this Department's jurisdiction, the nearest Department of Public Works Permit Office shall be contacted. The location can be found by searching for the jurisdiction office in the "County of Los Angeles Telephone Directory" under "Department of Public Works Road Maintenance Division." The importance of the blue reflective hydrant markers should be explained, and the requirement encouraged that the street be returned to its original condition, by replacing the hydrant markers.

TABLE 1 \*

<u>BUILDING SIZE</u> <u>(First floor area)</u>		<u>Fire Flow</u> *(1) (2)	<u>Duration</u>	<u>Hydrant Spacing</u>
Under 3,000	sq. ft.	1,000 GPM	2 hrs.	300 ft.
3,000 to 4,999	sq. ft.	1,250 GPM	2 hrs.	300 ft.
5,000 to 7,999	sq. ft.	1,500 GPM	2 hrs.	300 ft.
8,000 to 9,999	sq. ft.	2,000 GPM	2 hrs.	300 ft.
10,000 to 14,999	sq. ft.	2,500 GPM	2 hrs.	300 ft.
15,000 to 19,999	sq. ft.	3,000 GPM	3 hrs.	300 ft.
20,000 to 24,999	sq. ft.	3,500 GPM	3 hrs.	300 ft.
25,000 to 29,999	sq. ft.	4,000 GPM	4 hrs.	300 ft.
30,000 to 34,999	sq. ft.	4,500 GPM	4 hrs.	300 ft.
35,000 or more	sq. ft.	5,000 GPM	5 hrs.	300 ft.

\* See applicable footnotes below:

(FIRE FLOWS MEASURED AT 20 POUNDS PER SQUARE INCH RESIDUAL PRESSURE)

- (1) Conditions requiring additional fire flow.
  - a. Each story above ground level - add 500 GPM per story.
  - b. Any exposure within 50 feet - add a total of 500 GPM.
  - c. Any high-rise building (as determined by the jurisdictional building code) the fire flow shall be a minimum of 3,500 GPM for 3 hours at 20 psi.
  - d. Any flow may be increased up to 1,000 GPM for a hazardous occupancy.

- (2) Reductions in fire flow shall be cumulative for type of construction and a fully sprinklered building. The following allowances and/or additions may be made to standard fire flow requirements:
- a. A 25% reduction shall be granted for the following types of construction: Type I-F.R, Type II-F.R., Type II one-hour, Type II-N, Type III one-hour, Type III-N, Type IV, Type IV one hour, and Type V one-hour. This reduction shall be automatic and credited on all projects using these types of construction. Credit will not be given for Type V-N structures (to a minimum of 2,000 GPM available fire flow).
  - b. A 25% reduction shall be granted for fully sprinklered buildings (to a minimum of 2,000 GPM available fire flow).
  - c. When determining required fire flows for structures that total 70,000 square feet or greater, such flows shall not be reduced below 3,500 GPM at 20 psi for three hours.